Effect of nursing intervention on the Quality of life of children undergoing hemodialysis

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Abstract: Renal failure is a major health problem all over the world that significantly lessens Children' s quality of life. Their care is a complex process requires multi disciplinary systems and urgent attention when it is diagnosed. The aim of this study was to assess the effect of nursing intervention on the Quality of life of children undergoing hemodialysis. The study was conducted at pediatrics heamodialysis units of Tanta and Benha University hospitals. A convenient sample of 70 children with chronic renal failure was included in the study (30 of them from Tanta University hospital and 40 from Benha University hospital). Their ages ranged from 8-18 years, with mean age 12.80years±3.43. Interviewing questionnaire sheet and quality of life inventory scales were used to collect the required data. Data were collected in four phases(Initial phase, developmental phase, implementation phase and evaluation phase). The results of the current study revealed that, most of children were males (56%). A significant improvement in psychological domain score was found post intervention, in comparison to that pre intervention with significant decrease in categories of very poor quality of life (P=0.0001), and the percentage increased with the average and high quality of life (P=0.008and 0.061 respectively). There was no significant improvement in physical , social and school attendance domain score of quality of life post intervention in comparison to that pre intervention .with significant improvement only in high quality of life score of physical domain (P=0.002). Regarding to total score of quality of life, significant improvement was found regarding very poor, average and high quality of life post intervention (p=0.0001.0.010 and 0.005) respectively. Conclusion: Nursing intervention had positive effect on all domains of quality of life, specially psychological domain, which showed significant improvement. So it was recommended that, health education sessions should be conducted in heamodialysis units to all nursing staff as care providers, mothers and children to improve the compliance to the prescribed treatment as well as to help them to adapt with their limitation of the disease and its management.

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1. Introduction

Children with chronic renal disease commonly have an incurable condition. They and their families face a lifetime of medical treatment and uncertainty which need renal replacement therapy with dialysis and kidney transplantation. The mortality rate for children with kidney disease remains 30 times higher than for children without kidney disease [(1)]. Frequent hospitalization, infection, delayed growth and development, short stature, and bone disease are frequent complications[(2,3)] Care is complex and multidisciplinary requires multiple medications, invasive procedures, weekly hemodialysis for 4 to 5 hours or continuous peritoneal dialysis, and nutritional supplementation via enteral tubes and pump devices [(4,5)]. The kidneys play key roles in body function, not only by filtering the blood and getting rid of waste products, but also by balancing levels of electrolytes in the body, controlling blood pressure, and stimulating the production of red blood cells [(6)] .

The steady increase in the incidence of renal failure in US was 650,000 by year 2010, with accompanying medical care expenditure of 28 billion dollars.6 Kidney disease is the nine leading cause of death in the world (2004). The incidence among pediatric patient on hemodialysis is around 15 million a year[(7)]. In general population more than 30 people in every 100,000 develop kidney failure each year and the rate increase with age [(4-6)] .

Renal failure can happen rapidly – over days, weeks or months (acute) or slowly over a period of years. Acute renal failure may occur due to severe infection, sudden blockage to the drainage of urine from the kidney, kidney stone , hemolytic uremic syndrome or nephrotic syndrome .It may occur as side effect of some medications and other rare conditions[(7)] Acute kidney failure is manifested by ;drop in blood pressure, vomiting, diarrhea, dehydration and anurea.11 Most causes of acute renal failure can be treated and the kidney function will return to normal with time. Replacement of the kidney function by dialysis (artificial kidney) may be necessary until kidney function has returned [(8).]

Causes of chronic renal failure include: inflammatory conditions affecting the kidney tissue, birth defects, and chronic blockage to the drainage of the kidneys and as a result of certain inherited conditions such as polycystic kidney disease, glomerular diseases, systemic diseases and nephrotic syndrome. The clinical manifestations of such conditions include; tiredness, itching, loss of appetite, nausea, vomiting, breathlessness, edema and weakness [9-10] .

Chronic kidney damage is usually not reversible and if extensive, the kidneys may eventually fail completely. Dialysis or kidney transplantation will then become necessary. It is a serious condition which needs urgent attention when it is diagnosed because the kidney damage is usually 'silent' and not noticed at an early stage. Occasionally, it may be possible to identify and treat the cause of the renal failure itself. More commonly, the treatment has to be non-specific. In all cases, careful blood pressure control is extremely important in slowing the progress of kidney failure. One or more medicines to lower blood pressure may be given. Changes in diet may be necessary and include reducing salt intake, avoiding foods containing a lot of potassium and reducing the amount of protein and phosphate in the diet. [10-12]

Hemodialysis is carried out by the person's blood through an 'artificial kidney' machine that cleans the blood and returns it by tubing to a vein. This is done over a few hours, and needs to be repeated on average every couple of days in a specialized dialysis unit attached to a hospital. [13-15]

The prognosis of children with kidney failure and their quality of life depend on the underlying cause and presence or absence of other medical conditions.18 With progression of time, the mortality rate has decreased, due to better understanding of the causes and optimal treatment [16-18] .

Quality of life is a state of complete physical, mental and social well-being felt by an individual or a group of people. It refers to patient's ability to enjoy normal life activities. It is also defined as a patient's perception of the impact of disease and treatment functioning in a variety of dimensions It consists of physical, psychological and social aspects. 14 Quality of life is important for children with end stage renal disease; it is an indicator for the child wellbeing and functional statues [19-21] .

School attendance and performance also can be affected by heamodalysis sessions which needed to be conducted at least twice or three times per week, which in turn lead to physical exhaustion and lack of their concentration [3] .

Hypothesis:

Nursing intervention can improve or affect Childs' knowledge and compliance to treatment which in turn improve their physical and psychological conditions. So this study aimed to assess the effect of nursing intervention on the quality of life of children undergoing hemodialysis.

2. Subject and Methods

Type of the study:

Quazi- experimental design was used in this study.

Setting:

The study was conducted at pediatric hemodialysis units of Tanta and Benha University hospital.

A convenient sample of 70 children with chronic kidney failure was included in the study. Their age ranged from 8 -18 years (30 of them from Tanta University hospital and 40 from Benha University hospital).

Tools

Data were collected by using:

Interviewing questionnaire sheet includes two parts:

- Part one: Biosocial data of children (as age, sex, birth order, educational level).
- Part two: Effect of hemodialysis on physical, social and psychological aspects of the child.

1- Quality of life Scales:

Health Related Quality Of Life (HRQOL): The pediatric inventory scale of quality of life [22]. Was used to measure children and adolescent quality of life which includes the four domains (physical, emotional, social and school performance), each domain consists of 5 questions. Each question earned score from (0-4) according to their answer as the following:

4 means= never have a problem,
3 means= almost never a problem
2 means= sometimes a problem
1= it is often a problem
0= means almost always a problem

Each domain was scored from 0- 20. It is considered very poor from 0-<5, Poor from 5-<10, average from 10- < 15 and high if earned 15-20

- The total quality of life score ranged from 0-80 according to the following classifications :
  0-19: very poor quality of life.
  20-39: poor quality f life.
  40-59: average quality of life.
  60-80 : high quality of life

Methods:

Data were collected in 4 phases:

a) Initial phase:

Data were collected from June to Oct. to Feb. 2009-2010 in the previously mentioned setting. Children were met during dialysis in heamodialysis units to fill out the questionnaire. The time for each interview ranged from 35-40 minutes

b) Developmental phase:

It includes knowledge about steps and care during dialysis. The intervention also include knowledge about importance of complying with dialysis, diet, follow up and treatment. The practical part of the intervention was lengthy and comprehensive to cover all the items and activities required to maintain compliance with management and proper care.

c) Implementation phase:

Children were met individually in the previously mentioned settings;. The nursing intervention was conducted in three sessions; first session for the theoretical part of the intervention, the second and third session for all items of care.

d) **Evaluation phase**:

The effectiveness of intervention was assessed by comparing the results of the pre, and post intervention. Post test was divided into immediate post and three months post intervention .

3. Results:

The biosocial data of children indicated that, male children represented 56% of the studied children .Their age ranged between 12-18 years with mean age 12.80 ±3.43 years .The majority of them (80%) were none educated.

Table (1): presents the general problems of hemodialysis pre, immediately and after three months. It was found that, the highest percentage of children had pallor 99%, followed by insomnia 51% hypotension 49%, nausea and vomiting (25%) with significant improvement post intervention. (P=0. 0008, 0. 0001and 0.019, respectively). During dialysis no significant differences related to their problems were observed .While after dialysis, there was significant improvement regarding their exhaustion (p=0.023).

Table (1): Distribution of the studied children according to problems of haemodialysis.

Problems of haemodialysis	Pre (n=70)		Immediately Post-intervention (n=70)		3months post-intervention (n=70)		X2	P
	n	%	n	%	n	%		
General problems								
Bleeding	12	18	11	16	12	18	0.07	0.966
Shivering	19	28	11	16	14	20	2.82	0.244
Hypotension	34	49	36	51	32	46	21.56	0.0001*
Nausea & vomiting	18	25	6	9	10	14	7.86	0.019*
Allergy	11	16	7	10	4	6	3.67	0.153
Edema	18	25	17	24	16	23	0.16	0.925
Pallor	69	99	69	99	60	86	14.32	0.0008*
insomnia	36	51	5	7	8	11	46.69	0.0001
No problems	23	33	23	33	31	44	4.06	0.131
Problems before dialysis								
Headache	10	14	6	9	3	4	4.28	0.117
Hypotension	3	4	3	4	2	3	0.26	0.878
Exhausted	21	30	15	21	10	14	5.07	0.079
No problems	37	51	40	57	40	57	0.35	0.840
Problems during dialysis								
Headache	17	24	15	21	12	18	1.09	0.579
Hypotension	12	18	10	14	7	10	1.52	0.467
Vomiting	18	26	10	14	8	12	5.63	0.060
No problems	23	33	40	57	40	57	11.01	0.004*
Problems after dialysis								
Tired and exhausted	7	10	7	10	0	0	7.50	0.023*
No problems	52	74	60	86	62	89	5.63	0.060
Problems after 4 hrs from dialysis								
Exhausted	7	10	7	10	7	10	0.00	1.000
No problems	63	90	63	90	63	90		

*Significant (P<0.05).

It was clear from table (2) and fig. (1) that, there was significant improvement in children' knowledge immediately and three months post intervention regarding to different items of renal failure (P=0.0001).

Table (3) and fig.(2): Presents the total score of psychological domain of quality of life scale among the studied children pre and post nursing intervention. It was observed that, there was significant improvement in psychological domain score post intervention in comparison with pre intervention, with significant decrease of very poor quality of life from 72% pre intervention to 43% immediately post and 36% three months later .Also there was a significant increase of average quality from 9%pre intervention to 20% and 24% immediately and three months post intervention. (P=0.0001and 0.008 respectively) Table (4) and fig.(3): presents the total score of physical domain of quality of life scale among the studied children pre and post nursing intervention. It was noticed that, there was significant improvement with high quality of life score only as the percentage increased from nothing pre intervention to 9% post intervention (P=0.002). Table (5)and fig (4): shows total score of social domain of quality of life scale among the studied children pre and post nursing intervention. It was observed that, there was improvement in social domain post intervention with no significant differences (P=0.095). Table (6) and fig (5): presents the total score of school attendance domain of quality of life scale among the studied children pre and post nursing intervention. It was found that, there was improvement post intervention with no significant differences (P=0.706).Table (7) and fig (6): shows degree of total score of quality of life among the studied children pre and post nursing intervention. It was noticed that, there was significant improvement in total score of quality of life with significant decrease of very poor and significant increase of average and high quality of life. (P=0.0001.0.010and 0.005 respectively).

Table (2): Effect of the nursing intervention on children knowledge regarding renal failure

Correct answers of knowledge	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3 months post-intervention (n=70)		X2	P
	n	%	n	%	n	%		
• Definition.	11	16	62	88	50	72	83.72	0.0001*
• Causes.	0	0.0	59	84	64	92	149.18	0.0001*
• Clinical picture.	20	28	67	96	70	100	119.07	0.0001*
• Suitable Diet.	14	20	64	92	67	96	118.49	0.0001*
• Complications	0	0.0	64	92	62	88	157.62	0.0001*
• Treatment	3	4	59	84	53	76	109.03	0.0001*
• Management	8	12	62	88	48	68	91.15	0.0001*

*Significant (P<0.05)

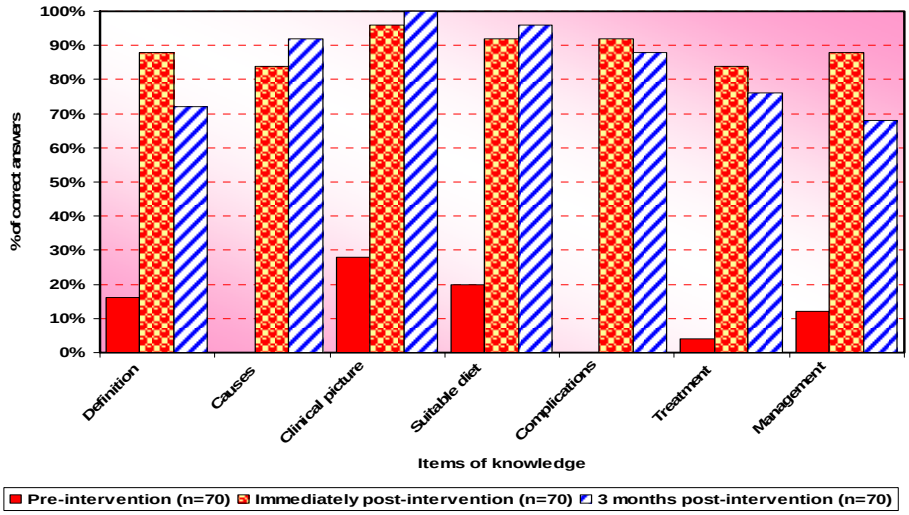

Figure (1): Effect of the nursing intervention on children knowledge regarding renal failure

Table (3): Total score of psychological domain of quality of life scale among the studied children pre and post nursing intervention.

Psychological Domain	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3 months post-intervention (n=70)		X^2	P
	n	%	n	%	n	%		
Very poor (0-<5)	50	72	30	43	25	36	20.00	0.0001*
Poor (5-<10)	10	14	16	23	12	17	1.80	0.407
Average (10- <15)	4	6	14	20	17	24	9.53	0.008*
High (15-20)	6	9	10	14	16	23	5.60	0.061
X^2 P	17.67 0.0001*							

*Significant (P<0.05)

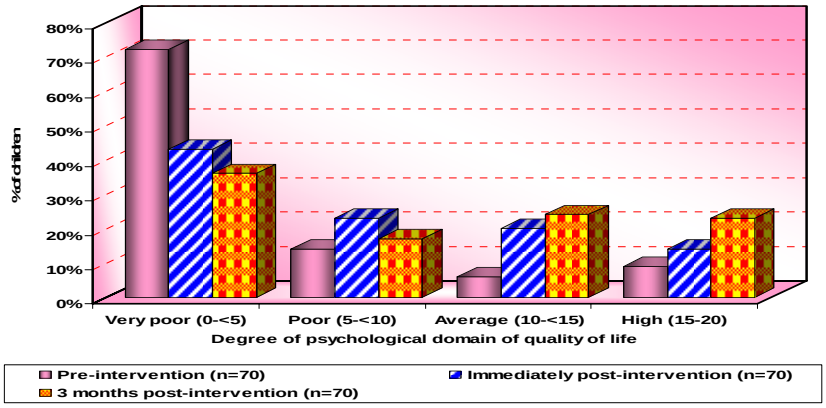

Figure (2): Total score of psychological domain of quality of life scale among the studied children pre and post nursing intervention.

Table (4): Total score of physical domain of quality of life scale among the studied children pre and post nursing intervention.

Physical Domain	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3months post-intervention (n=70)		X^2	P
	n	%	n	%	n	%		
Very poor (0-<5)	20	28	20	28	20	28	2.64	0.267
Poor (5-<10)	40	57	30	42	30	42	3.82	0.148
Average (10- <15)	10	14	14	20	20	28	4.37	0.112
High (15-20)	0	0	6	9	0	0	12.35	0.002*
X^2 P	5.75 0.072							

*Significant (P<0.05)

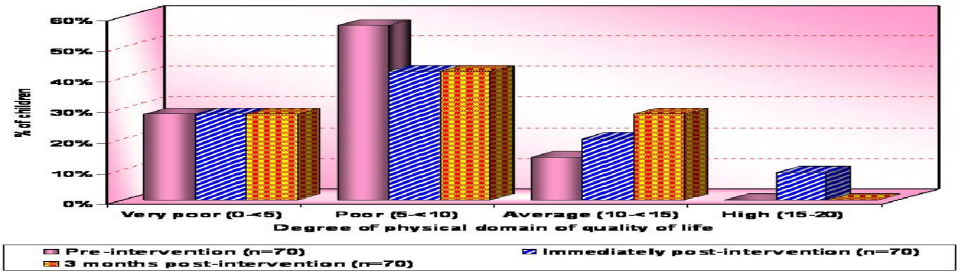

Figure (3): Total score of physical domain of quality of life scale among the studied children pre and post nursing intervention.

Table (5): Total score of social domain of quality of life scale among the studied children pre and post nursing intervention.

social Domain	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3months post-intervention (n=70)		X^2	P
	n	%	n	%	n	%		
Very poor (0-<5)	44	63	35	50	30	42	5.76	0.053
Poor (5-<10)	12	17	12	17	15	21	0.57	0.753
Average (10- <15)	8	12	13	18	15	21	2.61	0.270
High (15-20)	6	9	10	14	10	14	1.40	0.495
X^2 P	4.71 0.095							

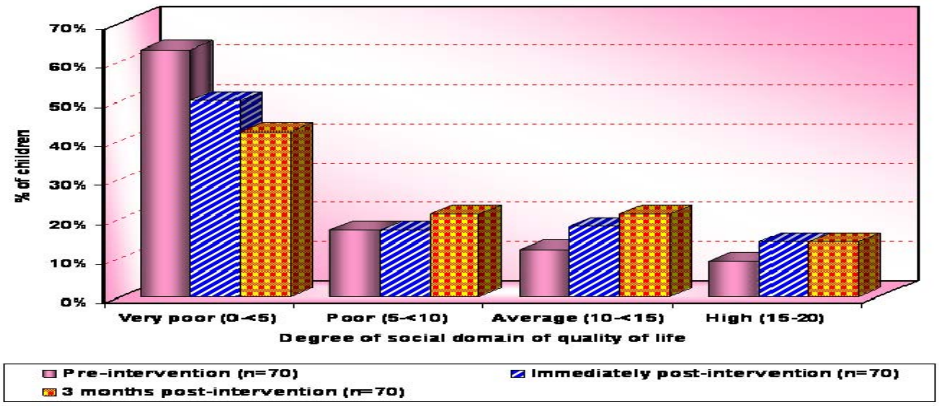

Figure (4): Total score of social domain of quality of life scale among the studied children pre and post nursing intervention.

Table (6): Total score of school attendance domain of quality of life scale among the studied children pre and post nursing intervention.

School attendance Domain	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3 months post-intervention (n=70)		X^2	P
	n	%	n	%	n	%		
Very poor (0-<5)	40	57	30	42	28	40	4.74	0.093
Poor (5-<10)	10	14	16	23	18	26	2.99	0.224
Average (10- <15)	10	14	10	14	10	14	0.00	1.000
High (15-20)	10	14	14	20	14	20	5.25	0.072
X^2 P	0.70 0.706							

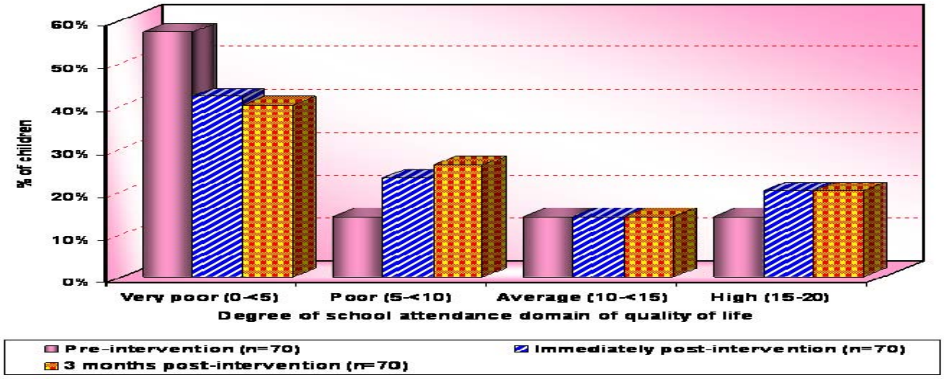

Figure (5): Total score of school attendance domain of quality of life scale among the studied children pre and post nursing intervention.

Table (7): Degree of total quality of life among the studied children pre and post nursing intervention.

Total Quality of life	Pre-intervention (n=70)		Immediately Post-intervention (n=70)		3 months post-intervention (n=70)		X^2	P
	n	%	n	%	n	%		
Very poor (0-19)	42	60	5	7	26	37	58.22	0.0001*
Poor (20-39)	19	27	29	41	19	27	4.38	0.112
Average (40-59)	6	9	20	29	14	20	9.14	0.010*
High (60-80)	3	4	16	23	11	16	10.57	0.005*
	23.70 0.0001*							

***Significant (P<0.05)**

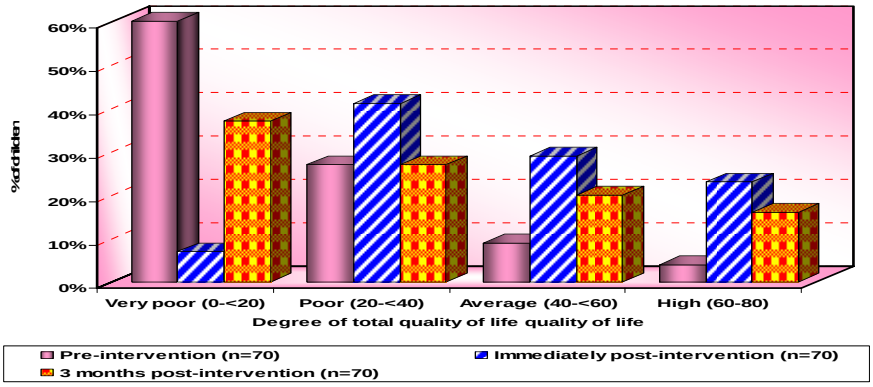

Figure (6): Degree of total quality of life among the studied children pre and post nursing intervention.

4. Discussion:

Kidney disease is considered a major childhood health problem as it causes death all over the world, which requires renal dialysis or kidney transplantation in order to survive(1,2). Kidney failure affects many stages of a child's life and influences their self-image and the relationships with peers and family. it can lead to physical and psychological problems (15-17).

The current study revealed that, males were more affected than females with the main common age 12-18 years. This result was supported by **Conger** (23) who found that ,CRF is much higher among males than females, and disagreed with others whom found that, more than half of children with hemodialysis were females (24,25).

Regarding to general problems of hemodialysis, it was found that, pre-intervention, the highest percentage of children had pallor (99%), followed by insomnia951%),hypotension (49%), nausea and vomiting (25%). During dialysis, no significant difference was found related to their problems. This is agreed with **Bergstrom** (26) who found the same

finding. While it was contradicted with others who reported that, the most common problems were hypertension, edema, loss of Weight and cardiovascular disease (25, 27).

Significant improvement was noticed regarding to insomnia as it being included in general health problems among children .Its frequency was decreased from 51 % pre intervention to only 7% immediately post intervention and became 11% after three months. This could be attributed to the adequate support and reassurance from the health providers during hemodialysis.

Regarding children's knowledge about renal failure, there was a significant improvement immediately and three months post intervention, comparing to that pre intervention. And this finding was congruent with other study that reported a highly significant difference in knowledge before and after hemodialysis educational program (28) .

From this perspective; more children at this stage need continues education to help them to be aware about their problems. According to cognitive and psychological developmental theories, children during this stage like and interest to be involved in care plan of their treatment and this theory recommended the importance of child's involvement in the plan of their care.

The current study revealed that, the total score of psychological domain of quality of life was significantly improved with the categories of very poor quality of life and the percentage increase with the average quality of life (P=0.0001 and 0.008 respectively) .This could be explained in the context of, the child with chronic illness need long term care and emotional support which help them to survive and to stay healthy. This finding agreed with others who reported that, good communication between ill child and health members are essential (29, 30).

This can be explained by, emotional support and education during hemodialysis may reduce the level of anxiety and stress of children and may also improve their self esteem. The study found a significant improvement in the quality of life of children post the intervention, compared to that pre intervention. Where the percentage was increased from 9% pre intervention to 14% immediately and 23% three months post intervention (P=0.061). This finding agreed with other study who stated that ,"better understanding of the nature of illness and how to manage can improve psychological state and decrease stress which finally improve their quality of life" (9) .

Regarding to physical domain of quality of life scale among the studied children pre and post nursing intervention, in general no significant differences were reported. While there was significant difference only with high quality of life score. (P=0.002). According to **David,** (31) many peoples with chronic kidney disease mentioned that, exercise was the key to help them feel normal again after dialysis. This is may be because exercise can help people with chronic kidney disease feel better physically and control their live emotionally. While others showed that, children of end stage of renal disease were poor in their daily physical living habits (32, 33). This indicates that the children with chronic renal failure are more unable to change their normal life style which in turn leads them to be more dependent on their families. This was supported by **Doulan,** (33)who pointed out that, it affected every aspect of patient life as normal daily activities, work, relationship and self concept. So, it was recommended that, health education is very essential to enhance the children's knowledge and help them to be more independent as much as they can.

Regarding to the total score of social domain of quality of life among the studied children, it was observed that, there was improvement post intervention in the very low quality of live as the percentage was decreased from 63% pre intervention to 50% and 42% immediately and three months after intervention. The percentage of high quality of life was improved from 9% pre intervention to 14% post intervention, with no significant differences. This finding was supported by **Mahmoud** (24) who found that, more than two thirds of the children hadn't problems when dealing with their family members, but disagreed with **Abd El- Tawab,** (25) who reported that, most of children undergoing hemodialysis had poor quality of life regarding to their social domain, where they cannot communicate with others and are socially isolated. This is might be owing to that, children after hemodialysis become very tired and exhausted and tend to be socially isolated. So the nurse can play a key role in supporting those children socially by seeking help from social experts.

As regard the total score of school attendance domain of quality of life scale among the studied children; an improvement was detected in the high quality of life score post intervention (20 %, compared to 10% pre intervention) with no significant differences. This can be explained by the base of recurrent school absence could be related to hemodialysis sessions which needed to be conducted at least twice or three times per week, which in turn lead to physical exhaustion and lack of their concentration. This finding agreed with another study who reported that, the children attend to hemodialysis center miss several hours of school each week and this absences can compound the learning problems that many children with kidney failure face (33).

Finally, it was noticed from the current results that, there was significant improvement in total score of quality of life regarding to very poor, average and high quality of life. (P=0.0001.0.010 and 0.005) respectively. However this finding contradicted with another study which reported that, the total score of quality of life for children undergoing hemodialysis was low and they had poor scores (25).

Conclusion

Nursing intervention had positive effect on the health problems accompanying heamodialysis specially insomnia and other health problems. Also it improved all domains of quality of life, specially psychological domain which showed significant improvement . So the child undergo heamodialysis need continuous education about the nature of the disease to enhance their knowledge that is in turn improve their quality of life. So, it was recommended that, heath education sessions should be conducted in heamodialysis units to all nursing staff as care provider, mothers and children to improve the compliance to the prescribed treatment as well as to help them to adapt with their limitation of the disease and its management.

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